

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
INQUIRE REGARDING CARRIES)	ET Docket No. 03-104
CURRENT SYSTEM, INCLUDING)	
BROADBAND OVER POWER LINE)	
SYSTEMS)	

To: The Commission

REPLY COMMENTS OF MERRILL L. STEVENSON

I. Introduction

The FCC stated in Notice of Inquiry ET Docket No. 03-104 they seek information and technical data so that they can evaluate the current state of Broadband Power Line (BPL) technologies and determine what changes to Part 15 of the Commission's rule are necessary to facilitate deployment of BPL technology. This document comments directly to those responses on record.

II. Reply Comments

In the FCC's initial notice, they begin with positive comments supporting BPL technology. However, the FCC recognized that for BPL technology to work, many questions had to be answered. The FCC purposely posed many technical questions not only to gain general comment but more importantly empirical data in order to identify the interference potential of BPL technology. In response to this inquiry came many responses that in general expressed concern for the potential interference that BPL technology would have on the HF frequencies. A number of comments in favor in BPL technology came from businesses that were involved in developing BPL technology.

Unfortunately the majority of positive comments ended up being a regurgitation of the positive benefits of BPL technology followed by very little technical data addressing the potential interference with the HF spectrum. Clearly these companies have the ability to identify the interference potential of BPL technology but chose not to for good reason. Unbiased and properly executed field trials would quickly identify major interference problems with BPL technology implementation. Instead, general comments were submitted with the hope that the FCC commissioners would not look too closely at what was submitted.

Reply Comments To AMPERION, Inc. Comments

Amperion failed to explain how interference from BPL technology would not create problems in the HF frequency spectrum. They commented that BPL technology deployments occurred in several locations in partnership with utility companies and as such conducted extensive emissions testing. They concluded that no complaints or instances of interference occurred while testing took place. No empirical data was put forth for this study. While they lauded BPL technology they agreed that measuring radiated/conducted emission limits testing, lacked empirical evidence. Amperion did admit that potential interference to the HF spectrum exists but explained it would be mitigated because, "energy levels roll off quickly as you get further

from the MV wire", but again with no data to support such a claim. In their conclusions Amperion Inc. felt that for the most part, Part 15 rules were sufficient and Amperion Inc. will work for further clarity. Given these comments, Amperion failed explain how BPL technology implementation would not interfere with existing HF spectrum users.

Reply Comments To ELECTRIC BROADBAND Comments

Electric Broadband failed to properly explain how interference from BPL technology would not create problems in the HF frequency spectrum. Again they provided glowing reports of how BPL technology implementation would benefit the public but when it came to the details of potential interference to the HF spectrum they provided little. In their comments, they state, "Experience appears to indicate that those limits can and should be raised to improve the functionality of BPL technology without harming other users. Electric Broadband believes the BPL test data already provided to the Commission, as well as the additional data that will be submitted in response to this NOI will establish that BPL devices that comply with existing CCS rules will not cause harmful interference to other users, and limits can be increased without harm." They further admit that measuring emissions and testing CCS devices has been difficult, consuming and costly. They go on to explain that it falls to the existing users of the HF spectrum to "be held responsible for taking steps to mitigate their vulnerability to interference" In essence they are telling existing HF spectrum users too fix whatever interference problems BPL technology implementation creates. Broadband Electric failed to provide detailed empirical data supporting their case that BPL technology implementation would not interfere with existing HF spectrum users.

Reply Comments To PHONEX BROADBAND CORPORATION Comments

Phonex Broadband Corporation failed to properly explain how interference from BPL technology would not create problems in the HF frequency spectrum. In regards to the interference issue, there main point centers around a cavalier philosophy toward the HF spectrum. They state, "customer complaints should be avoided, but the FCC should let allow the BPL technology companies to innovate and grow without constraints". They are in essence saying, let us regulate ourselves. Unfortunately history is full of examples of commercial undertakings that failed to protect persons and the environment when money was to be made. Phonex Broadband Corporation failed to provide detailed empirical data supporting their case that BPL technology implementation would not interfere with existing HF spectrum users.

Reply Comments To PPL TELCOM, LLC Comments

PPL Telcom, LLC failed to properly explain how interference from BPL technology would not create problems in the HF frequency spectrum. They reference Amperion and Main.net as having completed extensive testing. Amperion did not provide any empirical data as part of NOI. Main.net did in fact provide some theoretical information along with a technical paper from Germany and the statement that measurements occurred at some homes. Actual detailed field data was not supplied. PPL Telcom, LLC did agree to have completed extensive FCC testing and that their equipment would have appropriate FCC stickers on their equipment but chose not to address specific concerns about radiated emission measurements. Given these comments, PPL Telcom, LLC failed to

provide detailed empirical data supporting their case that BPL technology implementation would not interfere with existing HF spectrum users.

Reply Comments To CURRENT TECHNOLOGIES, LLC Comments

Current Technology, LLC failed to properly explain how interference from BPL technology would not create problems in the HF frequency spectrum. Their main goal is adopt BPL rules quickly without depending too much on data collection in regards to what interference PLC technology poses to the HF spectrum. They go on further to say, that the HF spectrum is already noisy and no BPL regulation can "re-quiet" the band. They ask the FCC to minimize technical regulation and to minimize non-technical regulation. Their whole concept of BPL technology implementation centers around the concept of no regulation and let us do what we want because measuring emissions is a difficult task and the clock is running. Given these comments, Current Technology, LLC failed to provide detailed empirical data supporting their case that BPL technology implementation would not interfere with existing HF spectrum users.

III. Additional Comments

The level of empirical data submitted by those in favor of BPL technology is sorely lacking and for good reason. BPL technology is a broken and polluting technology that if looked at carefully would fully demonstrate a severe interference potential to the HF spectrum. This has been already well documented by other studies conducted around the world. The Commission is directed to review the following sources of information:

Calculated Impact of PLC on Station Operating in the Amateur Radio Service
Internet: <http://www.arrl.org/tis/info/HTML/plc/files/C63NovPLC.pdf>

Summary: This is a presentation that Ed Hare, W1RFI, ARRL Laboratory Manager, gave at the November 2002 meeting of the IEEE C63 EMC standards committee. It contains a tutorial on PLC, calculations on the interference from carrier-current devices. ARRL's calculations estimate that the ambient noise level near PLC systems could increase as much as 70dB.

Japan's Government Concluded That It is not suitable to allow HF band for PLC
Internet: http://www.jarl.or.jp/English/4_Library/A-4-1_News/jn0208.htm

Summary: On April 30, 2002, the Ministry's study group on PLC held its first public hearing with JARL, Association of Radio Industries and Business and others. At the meeting, the results of collaborated field test, which were held in January, 2002, were reported. The test included, monitoring leakage of electric waves from power lines-specifically in cases of providing Internet access via power lines to homes. In this way, the JARL actively cooperated with the group. As a result, MPHPT's study group officially announced in its fifth meeting on July 31 that it is too early to allow PLC between 2MHz and 30MHz due to hazardous effects on HF users.

On Radio Interference Assessments of Access PLC System

Internet: <http://www.qsl.net/jh5esm/PLC/isplc2003a2-3.pdf>

Summary: Access PLC system is considered one of the "last mile" solutions. However, HF PLCs using overhead distribution would be an interference source to radio communications services and scientific observations in this band. This paper describes assessment test results in Japan. One of them is carried out as a part of government's investigations.

Bad LCL characteristics of mains results large amount of radio interference, and thus the deregulation in Japan is shelved.

Interference measurements in HF and UHF band caused by extension of power line communication bandwidth for astronomical purpose

Internet: <http://www.qsl.net/jh5esm/PLC?isplc2003?isplc2001a7-1.pdf>

Summary: Power line communication (PLC) system which extends the available frequency bandwidth up to 30 MHz has been proposed in Japan. The electromagnetic interference problems on PLC has been investigated by the PLC study group organized by the Ministry of Public Management Home Affairs, Post and Telecommunications (MPHPT). The study group held collaborated field experiments of the PLC facility and we measured interference caused by the PLC facility in the HF and UHF band in order to evaluate the influences of the expansion of PLC bandwidth on radio astronomical observations. In the field experiment, two set of PLC modems (SS and OFDM) were tested as an access system. During the test the PLC modems were on, the HF spectra showed a strong increase of the noise floor level, and it was found that the PLC noise exceeded the level of galactic noise by more than 30 dB. In the UHF band, spurious emission around 327 MHz was identified. In both HF and UHF band the interference exceeded the limit of harmful interference level for radio astronomical observation which is given in Recommendation ITU-RTA769.1. Safety distances where the recommendation is satisfied are estimated to be 219 km and 12 km at 9.2 MHz and 327 MHz, respectively. PLC seems to be harmful interference source for radio astronomical observations in both HF and UHF bands.

The Radio Amateur and the Effects of the Use of the 230-Volt Power Line for Broadband Data Communications

Internet: http://www.darc.de/referate/emv/plc/VERON_PLC_Report.pdf

Summary: The 38 page technical paper starts with a PLC tutorial, then outlines the test methods and results of PLC testing by Dutch amateurs. At the turn of the year a series of measurements was conducted to evaluate the risks of interference by PLC for the amateur station PA0KDF. Both in house and outside the house field strength measurements were taken and compared with the CEPT proposed radiation limits (NB 30, Norwegian Limit and BBC limit). In addition the coupling between the mains wiring and the antennas of the amateur was determined. In an audio test, where use was made of amateur antennas and receiver, the level of interference in the HF amateur bands was evaluated. Only in the case of the strictest limit, the BBC limit, adequate protection was provided against mains injected interference signals. In addition measurements were performed to find the "normal" interference levels of the wiring mains. Firstly it became apparent that the present interference levels in a quiet rural areas are far below the CISPR 22 limits and secondly, injection of interference signals with a level equal to the CISPR 22 limit causes harmful interference to the reception of signals in the amateur bands.

Notes on the Final Report of the RS's TWG on the Compatibility of DSL and PLT with Radio

Services 1.6 to 30 MHz Compiled by the RSGB for the benefit of Radio Amateurs
Internet: <http://www.qsl.net/rs.gb/emc/Notes%20on%20Fin%20Rpt%20Ver%201.pdf>

Summary: The Radio Society of Great Britain summary of the work of the British government's Radio Communications Agency Technical Working Group on DSL and PLC the WG's position on the PLC, the extent of the interference problems reported and expected with PLC and lists of a number of papers that have been produced by companies and organizations that support the conclusion.

The DSLPLC WG Final Report - US Technical Working Group (TWG) on Compatibility Between Radio Services and VDSL + PLT System Operating between 1.6 and 30 MHz
Internet: <http://www.radio.gov.uk/topics/interference/documents/dslplt.htm>

Summary: This summary report of the British Radiocommunications Agency (RA) TWG concludes, "Field tests were undertaken by Agency officials to determine the possible levels of emissions from VDSL

and PLT access systems receptively. The scope of this practical work was, by agreement, necessarily limited due to constraints on time and available facilities. It is accepted therefore that the significance of the results is correspondingly limited insofar as neither the VDSL and PLT access test arrangement was truly representative of likely practical commercial deployments. Nevertheless, sufficient data was gathered which enabled TWG to conclude that there is a finite possibility of interference to radio systems when operated within a few meters of cables or wires associated with VDSL or PLT systems. The propagation characteristics of the HF bands are unique in that it is possible, under certain conditions, to provide extended communications over exceptionally long distances, several thousand kilometers being a reasonable expectation under ideal conditions. This means that the bands are particularly valuable for international broadcasting; military applications; long distance maritime and aeronautical communication and navigation, and as a challenging recreational pursuit for amateur radio enthusiasts looking to develop techniques to establish contact over increasingly long distances taking into account of prevailing conditions. But such extended propagation is variable, depending very much on seasonal conditions and natural changes in the ionosphere. This means that planning HF systems requires quite different techniques and assumptions to those used in higher order bands, where the limit of expected service area can be predicted.

PLT Test Information Including Sound Bites

Internet: http://www.qsl.net/rsgb_emc/PLTREP.pdf

Summary: This report summarizes field tests of PLC made by the Radio Society of Great Britain. As already reported elsewhere, it is difficult or almost impossible to capture and present the emissions from new broad-band-communication systems using spread-spectrum-technologies at low or unknown data-rates (stand-by) by simple use of a spectrum analyzer. Nevertheless, even at these very low data-rates, the harmful effect of these emissions on radio systems all over the spectrum used for radio communications is at once evident, as soon as emissions exceed the conventional limits.

PLC in Finland

Internet: <http://www.darc.de/referate/emv/plc/plc-oh.pdf>

Summary: PLC for the present rejected by Finnish Telecommunication Minister. In the Finnish Amateur Radio League's monthly magazine, "Radioamatoori", June 2001 on pages 12 to 17, there is an article about a session held on PLC in the Finnish Telecommunication Administration Center on May 16th, 2001. For the present, because of the technical problems encountered, introduction of PLC technology is not possible.

Current Situation on the Field Trail and Other Tests Performed in the Netherlands Internet: <http://www.agentschap>

telecom.nl/informatie/plc/NL_versie6_final.pdf

Summary: This paper describes measurements made of the radiating characteristics of a number of houses in Holland. In Europe, it is common to have 100 or more houses connected to a transformer, with each house fed with close-spaced or twisted-pair electrical wiring. Under these circumstances, the wiring radiation effectiveness was measured at about a -30dBi average. In the

US, access PLC signals would have to be coupled past the transformer onto the medium voltage distribution lines, which will radiate more efficiently than twisted pair and house wire. The report also describes the cumulative effects of multiple emitters by skywave. According to this, a PLC system with 4 emitters per square kilometer will have a skywave propagated signal of -23 to -52 dBuV/m to distant areas.

In addition to the above reference studies, there exists extensive video and audio recordings of BPL technology interference from Austria, Japan and England that can be reviewed on the ARRL website, <http://www.arrl.org/tis/info/HTML/plc/> .

IV. Conclusion

There is a common thread that runs through most of the comments provided in favor of BPL technology implementation. These comments reflect a total indifference to the interference potential the BPL technology presents to current HF spectrum users. Those in favor of BPL technology implementation hope the FCC will not look too closely at the interference problems BPL technology will bring to the HF spectrum and to give these business interests a pass to proceed with actual implementation with the understanding that they must not interfere with other HF frequency users. Unfortunately history is full of examples of the government relying on businesses to do the right thing resulting in major abuses of people and environment. Given the severe interference problems BPL technology would pose to existing HF spectrum users, it would be premature to approve BPL technology implementation or to make any changes to existing Part 15 rules that would accommodate BPL technology at this time.

Respectfully Submitted
MERRILL L. STEVENSON
6283 St. James Drive
Carmichael, California